BROOKHAVEN NATIONAL LABORATORY

Work Permit # _____
Work Order # _____
Job# _____ Activity# _____

1. Work requester fills out this section. ☐ **Standing Work Permit**

Requester: Don Lynch	Date: 6/28/2006	Ext.: 2253	Dept/Div/Group: PO/Phenix
Other Contact person (if different from requester): Sal Marino			Ext.: 3704
Work Control Coordinator: Don Lynch		Start Date: 7/10/06	Est. End Date: 10/16/2006
Brief Description of Work: Repair and/or replace FEM's inside North and South Muon Magnets			
Building: 1008	Room: IR	Equipment: n/a	Service Provider: PHENIX

. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS				
Radiation Concerns	☒ None	☐ Activation	☐ Airborne	☐ Contamination	☐ Radiation
Radiation Generating Devices:	☐ Radiography	☐ Moisture Density Gauges	☐ Soil Density Gauges	☐ X-ray Equipment
☐ Special nuclear materials involved, notify Isotope Special Materials Group			☐ Fissionable materials involved, notify Laboratory Criticality Officer	
Safety Concerns	☐ None	☐ Ergonomics	☐ Transport of Haz/Rad Material	
☐ Adding/Removing Walls or Roofs	☒ Confined Space*2A	☐ Explosives	☐ Lead*	☐ Penetrating Fire Walls
	☐ Corrosive	☐ Flammable	☐ Magnetic Field*	☐ Pressurized Systems
☐ Asbestos*	☐ Cryogenic	☐ Fumes/Mist/Dust*	☐ Material Handling	☐ Rigging/Critical Lift
☐ Beryllium*	☐ Electrical	☐ Heat/Cold Stress	☐ Noise*	☐ Toxic Materials*
☐ Biohazard*	☐ Elevated Work*	☐ Hydraulic	☐ Non-ionizing Radiation*	☐ Vacuum
☐ Chemicals*	☐ Excavation	☐ Lasers*	☐ Oxygen Deficiency*	☐ Other
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? ☐ Yes ☒ No				
Environmental Concerns		☒ None	☐ Work impacts Environmental Permit No.	
☐ Atmospheric Discharges (rad/non-rad)		☐ Land Use	☐ Soil Activation/contamination	☐ Waste-Mixed
☐ Chemical or Rad Material Storage or Use		☐ Liquid Discharges	☐ Waste-Clean	☐ Waste-Radioactive
☐ Cesspools (UIC)		☐ Oil/PCB Management	☐ Waste-Hazardous	☐ Waste-Regulated Medical
☐ High water/power consumption		☐ Spill potential	☐ Waste-Industrial	☐ Underground Duct/Piping
Waste disposition by:				☐ Other
Pollution Prevention (P2)/Waste Minimization Opportunity:		☒ None ☐ Yes		
FACILITY CONCERNS	☒ None			
☐ Access/Egress Limitations	☐ Electrical Noise	☐ Potential to Cause a False Alarm		☐ Vibrations
	☐ Impacts Facility Use Agreement		☐ Temperature Change	☐ Other
☐ Configuration Control	☐ Maintenance Work on Ventilation Systems		☐ Utility Interruptions	
WORK CONTROLS				
Work Practices				
☐ None	☐ Exhaust Ventilation	☒ Lockout/Tagout Magnet	☐ Spill Containment	☐ Security (see Instruction Sheet)
☒ Back-up Person/Watch	☐ HP Coverage	☐ Posting/Warning Signs	☐ Time Limitation	☐ Other
☐ Barricades	☐ IH Survey	☐ Scaffolding-requires inspection	☐ Warning Alarm (i.e. "high level")	
Protective Equipment				
☒ None	☐ Ear Plugs	☐ Gloves	☐ Lab Coat	☐ Safety Glasses
☐ Coveralls	☐ Ear Muffs	☐ Goggles	☐ Respirator	☐ Safety Harness
☐ Disposable Clothing	☐ Face Shield	☐ Hard Hat	☐ Shoe Covers	☐ Safety Shoes ☐ Other
Permits Required (Permits must be valid when job is scheduled.)				
☒ None	☐ Cutting/Welding	☐ Impair Fire Protection Systems		
☐ Concrete/Masonry Penetration	☐ Digging/Core Drilling	☐ Rad Work Permit-RWP No		
☐ Confined Space Entry	☐ Electrical Working Hot	☐ Other		
Dosimetry/Monitoring				
☒ None	☐ Heat Stress Monitor	☐ Real Time Monitor	☐ TLD	
☐ Air Effluent	☐ Noise Survey/Dosimeter	☐ Self-reading Pencil Dosimeter	☐ Waste Characterization	
☐ Ground Water	☐ O_2/Combustible Gas	☐ Self-reading Digital Dosimeter	☐ Other	
☐ Liquid Effluent	☐ Passive Vapor Monitor	☐ Sorbent Tube/Filter Pump		
Training Requirements (List below specific training requirements)				
PHENIX Awareness, Confined Space				

Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:				**If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)**	
ES&H Risk Level:	☒ Low	☐ Moderate	☐ High	WCC:	Date:
Complexity Level:	☒ Low	☐ Moderate	☐ High	Service Provider:	Date:
Work Coordination:	☐ Low	☒ Moderate	☐ High	Authorization to start	Date:
				(Departmental Sup/WCC/Designee)	

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): See Attached
Special Working Conditions Required: None
Operational Limits Imposed: None
Post Work Testing Required: No
Job Safety Analysis Required: ☐ Yes ☒ No Walkdown Required: ☒ Yes ☐ No

Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.

Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator				
Service Provider				
	Review Done: ☐ in series	☐ team		

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)
a) WCM/WCC: Is any feedback required? ☐ Yes ☐ No

b) Workers: Are there better methods or safer ways to perform this job in the future? ☐ Yes ☐ No

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

Work plan Attachment **WP# _____**

Repair and/or replace FEM's inside North and South Muon Magnets in PHENIX IR, Bldg. 1008

South and North Muon Magnet Confined Space Entry – Class 2A: Enter the South Muon Magnet (MMS) or the North Muon Magnet (MMN) in the experimental hall and repair/replace electronic modules (FEM Cards) as indicated in the attached sketches. The detector chambers inside the MMS and MMN contain inert gas (N_2). Hazardous Atmosphere Testing is not required. The hazards are that (a) entry is made via ladder (MMS) through an opening created by removing the east vertical lampshade about 11 feet above track level, or (b) through the base hatch (MMN), and the magnet has a sloping floor (35 to 35 degree from vertical) which may present the danger of a slip/fall (about 6 feet elevation change down sloping floor). Though structural elements of the detector are within reach for support, further mitigation is provided by installing "steps" on the sloping floor, and adherence to the "two person" rule. When the magnet is occupied, two people must be present and within talking distance at all times.

This work is to be done by fully trained and experienced PHENIX personnel, under the supervision of Sal Marino. A properly executed and signed Confined Space Entry (CSE) Certification is required prior to entry.

Procedure

LOTO the power to the magnet coil at the power supply in1008B. (Pearson)

Verify that no gas is flowing to the chambers. (Biggs)

Secure a ladder to the east side of the MMS. For the MMN provide a step ladder to enter via the hatch. (Marino)

Enter either magnet and install the pre-fabricated steps on the lower east lampshade panel (MMS and MMN) working from the bottom up. If access is required to any west side electronics the stairs to that side will also be installed. Work is limited to the bottom three sectors of stations 2 and 3 and the lower crates of the vert6ical sectors that may be easily reached from the steps. (Marino, MuTr experts)

Enter the magnet and remove/repair/replace FEM components. When one person enters the other will provide backup watch at the entry opening/hatch. (MuTr experts)

Once work is complete, remove the internal steps, sweep the magnet interior for tools and personnel and remove the external access ladder. (Marino, MuTr experts)

Remove LOTTO on magnet power supply. (Pearson)

BROOKHAVEN NATIONAL LABORATORY

CONFINED SPACE ENTRY CERTIFICATION

Location Building 1008, IR, Muon Magnet South (MMS)		Date
Department PO	Division PHENIX	
Building 1008	Area/Location/Room: IR, MMS	
Supervisor/Designee Don Lynch/SalMarino		Life # 20146/15767

PRE-ENTRY QUESTIONS ***For each item, check "yes" or "no": If no, consult Supervisor***	**YES**	**NO**
Is entry essential to perform work?	□	□
Have all personnel been trained in confined space entry?	□	□
Are conditions safe to remove utility-hole cover?	□	□
Has opening been guarded?	□	□
Is monitoring equipment calibrated?	□	□
Has monitoring been performed and recorded below?	□	□
Is GFCI used, if outside or in wet conditions?	□	□
Is ventilation blown into bottom of space? (If required)	□	□
Are personnel instructed to evacuate upon hazard detection?	□	□
Have all workers reviewed these entry requirements?	□	□
Radiation: If present, RWP may be required – review work with ESH Coordinator and RCD personnel. Evaluate hazards and controls.	□ **Reviewed**	□

SPACE CLASSIFICATION QUESTIONS For each item, check box only if "yes"	Class 2A	Class 2B	Class 2C
Engulfment Hazard Present			□
Entrapment Hazard Present			□
Electrical Systems:			
• Deenergized	□		
• Energized and Working Hot			□
• Energized, but Guarded or not Working Hot	□		
Mechanical Systems:			
• Deenergized	□		
• Energized and Working Hot			□
• Energized but Guarded or not Working Hot	□		
Other Energized Systems: (e.g., steam, sewage)			
• Deenergized	□		
• Energized and Working Hot			□
• Energized but Guarded or not Working Hot	□		
Chemical Hazards inherent in space, based upon monitoring, but controllable by ventilating		□	
Chemical Hazards inherent in space, based upon monitoring, but not controllable by ventilating			□
Chemical Sources, introduced into space? (e.g., welding fumes, solvents)			□
High Temperature/Pressure Hazard? (other than steam utility-holes)			□

- If ANY box in column 2C is checked, a Confined Space Permit **IS** required.
- If any box in column 2B is checked, and none in column 2C, a Confined Space Permit **IS NOT** required **BUT** continuous monitoring and ventilating ARE required.
- If only boxes in column 2A are checked, no additional requirements apply.

Classification evaluation

CLASSIFICATION		
CLASS:2A	I have completed the front and back of this Confined Space Entry Certification form and classified this space. If the confined space is classified as a 2C, I will obtain a Confined Space entry permit. If the space is Class 2B, continuous monitoring and ventilation is required and will be documented on this form.	
	Supervisor/Designee: Life #	Date:

BNL CONFINED SPACE ENTRY CERTIFICATION

Meter:	Serial #	Calibration Date:
Day of Use Sensor Check □ Yes □ No		
Tested By:		BNL#:

MONITORING RESULTS					
Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O2)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H2S ppm)	Other:
Pre-Entry Certification test					
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	<25 ppm	<10 ppm	

Supplemental sampling record

CLASS 2B CONFINED SPACE ENTRY CERTIFICATION

For Class2B spaces, continuous monitoring is required.

MONITORING RESULTS					
Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O2)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H2S ppm)	Other:
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	25 ppm	10 ppm	

Class 2B: Describe Method of Ventilation:

Muon Magnet Confined Space Entry Certification Sheet

*The undersigned certify that they have taken the BNL Confined Space Training, BNL Course # **HP-OSH-016**, within the last twelve months, and understand the hazards involved in working in the south and north muon magnets (**MMS and MMN).***

DATE	SIGNATURE	LIFE/GUEST #